ANNUAL REPORT 1965

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ONTARIO WATER RESOURCES COMMISSION

LAKEVIEW

water pollution control plant

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DIVISION OF PLANT OPERATIONS
Ontario Water Resources Commission

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ONTARIO WATER RESOURCES COMMISSION

OFFICE OF THE GENERAL MANAGER

Members of the Lakeview Local Advisory Committee,
The Township of Toronto and the Municipality of
Metropolitan Toronto.

Gentlemen:

I am pleased to provide you with the 1965 Annual Report for the Lakeview Water Pollution Control Plant, OWRC Project No. 59-S-43.

We appreciate the co-operation you have extended to our Operations staff throughout the year, and trust that continuation of this close association will ensure even greater progress in the sphere of water pollution control.

Yours very truly,

D. S. Caverly,
General Manager.

ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET

TORONTO 5

J. A. VANCE, LL.D.
CHAIRMAN

J. H. H. ROOT, M.P.P.
VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER

W. S. MacDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am pleased to provide you with the 1965 Annual Report on the operation of the Lakeview Water Pollution Control Plant, OWRC Project No. 59-S-43.

The report presents design data, outlines operating problems encountered during the year and summarizes in graphs, charts and tables all significant flow and cost data.

Yours very truly,

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

FOREWORD

This report provides useful information on the operating efficiency of this project during 1965. It is intended to act as a guide in gauging plant performance. To implement that aim, it includes detailed statistical and cost data, a description of the project and a summary of its operation during the year.

Of particular interest will be the cost data, which show the total cost to the municipality and the areas of major expenditure.

The Regional Operations Engineer is primarily responsible for the preparation of the report, and has compiled and arranged the material. He will be pleased to answer any questions regarding it. Other groups, however, were involved in the production, and these include the statistics section, the Drafting Section of the Division of Sanitary Engineering and the Division of Finance.

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

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LAKEVIEW

water pollution control plant

operated for

THE TOWNSHIP OF TORONTO

and

THE MUNICIPALITY OF METROPOLITAN TORONTO

by

THE ONTARIO WATER RESOURCES COMMISSION

CHAIRMAN: Dr. James A. Vance

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F. A. Voege — A. K. Watt

COMMISSION SECRETARY

W. S. MacDonnell

DIVISION OF PLANT OPERATIONS

DIRECTOR: B. C. Palmer

Assistant Director: C. W. Perry
Regional Supervisor: A. C. Beattie
Operations Engineer: A. Clark

801 Bay Street Toronto 5

'65 REVIEW

As in 1964 the quality of the effluent did not meet the OWRC objectives of 15 ppm BOD and 15 ppm SS due to the excessive flow to the plant.

The average daily flow for 1965 was 7.2 mgd. At no time was the plant operating within the design capacity of 5.0 mgd.

During peak flows it was necessary to by-pass part of the flow after primary treatment.

Sludge haulage costs were cut considerably due to the use of lagoons for digested sludge. Supernatant from these lagoons was pumped back to the plant.

The Division of Research obtained valuable information from investigations of these lagoons.

Studies were conducted on digester operation with subsequent operating improvements.

Due to the industrial waste content the strength of the raw sewage is high.

GLOSSARY

BOD	biochemical oxygen demand (a measure of organic content)
cfm	cubic feet per minute
comminution	shredding of solids into small fragments
DWF	dry weather flow
effluent	outflow
flocculation	bringing very small particles together to form a larger mass (the floc) before settling
fps	feet per second
gpcd	gallons per capita per day
gpm	gallons per minute
grit	sand, dust, stones, cinders and other heavy inorganic material
influent	inflow
lin. ft.	lineal feet
mgd	million gallons per day
mlss	mixed liquor suspended solids
ppm	parts per million
ss	suspended solids
TDH	total dynamic head (usually refers to pressure on a pump when it is in operation)

HISTORY
1956 - 1965

In 1956, the Township of Toronto and the Ontario Water Resources Commission initiated plans for the construction of a modern water pollution control plant. The firm of Gore and Storrie, Toronto Ontario, was engaged to prepare plans and specifications for the project.

In April 1957, Metropolitan Toronto expressed interest in sharing the cost with the Township of Toronto in the construction of a joint water pollution control plant, the costs to be shared 70 percent by Metropolitan Toronto and 30 percent by the Township of Toronto.

APPROVAL

On June 6, 1960, the municipalities signed an agreement with the Ontario Water Resources Commission to finance, construct, and operate a water pollution control plant.

CONSTRUCTION

Schwenger Construction Co. Ltd. - Burlington, Ontario was awarded the contract and the project was officially opened on November 24, 1961.

TOTAL COST

The total cost of the project was $1,883,755.



Project Staff

K. Stratton
Plant Superintendent

Mr. K. Stratton, Plant Superintendent, joined the Commission in May 1958 as an operator at the Stratford Water Pollution Control Plant. He later became Chief Operator and in October 1961 was transferred to the Toronto-Lakeview plant and promoted to Plant Superintendent.

Other members of the Toronto-Lakeview staff are:

R. Tufts	Chemical Technologist
F. Mines	Plant Mechanic
S. McKnight	Mechanics Assistant
A. Srebotnjak	Operator
W. Cation	Operator
M. H. Godfrey	Operator
P. Caulfield	Operator
D. Aspinall	Operator
F. Press	Groundsman and Janitor
A. Colson	Labourer
J. Wood	Labourer



Description of Project

INFLUENT WORKS

The waste water enters the plant through a 48 inch diameter sewer, passing into the influent chamber. The chamber is equipped with a bar screen to remove large objects from the sewage. The flow then discharges to the aerated grit chamber where the velocity of flow is reduced sufficiently to allow grit and detritus material, which may damage plant machinery, to settle out. The air introduced in the chamber produces a roll which allows grit to settle out, while keeping the organic material in suspension. A clam shell bucket hoist removes the settled grit.

From the grit chamber, the flow passes through a comminuting device which screens and shreds the larger particles to a size suitable for handling in the treatment units. From this point, the flow is discharged to the primary tanks.

PRIMARY SEDIMENTATION

The two rectangular tanks are designed to provide an adequate detention period to allow the heavier solids to settle out, and for removal of surface scum and grease.

The tanks are divided into two sections and equipped with longitudinal sludge collectors which serve as skimming mechanisms for removal of surface material and for transferring the settled sludge to hoppers located at the end of the tanks. The sludge hoppers are equipped with cross collector mechanisms which draw the sludge to a central

point. The sludge and the surface material is drawn off and pumped to the primary digester.

The primary tanks are designed to provide a detention period, sufficient to allow removal of approximately 30-35% of the heavy organic material.

The settled waste water flows over the effluent weirs and discharges into the aeration tanks.

AERATION

The flow upon entering these two, three pass, aeration tanks undergoes another detention period which provides the biological environment required to remove the finely divided, suspended and dissolved organic materials remaining in the flow.

The settled sludge (activated sludge), from the final settling tanks, is recirculated back to the aeration tanks, and mixes with the incoming effluent from the primary tanks. This mixed liquid is then aerated by air, which is supplied from compressors. The air supplied provides the oxygen requirements of the biological communities of aerobic micro-organisms (mixed liquor sludge floc) and also produces a roll which prevents settling in the tanks. The activated sludge which is returned acts as the vehicle for the bacteria which in turn oxidizes the organic material contained in the sewage.

The mixed liquor then passes into the final settling tanks where the activated sludge is settled out.

FINAL SEDIMENTATION

The three rectangular final sedimentation tanks provide a detention period to allow remaining activated sludge solids to settle out. It is the activated sludge, settling out in these tanks, that is returned to the aeration tanks to provide the continuous environment for the maintenance of the floc in the aeration section.

The final sedimentation tanks are equipped with two longitudinal sludge collectors which transfer the settled sludge to the hopper located at the end of the tank. Cross collectors transfer the sludge from the hopper to a central point from where pumps transfer it back to the aeration tanks or to waste. After final settling, the effluent flows through a Parshall flume which measures the flow leaving the plant and then to the chlorinating manhole.

DIGESTION

Sludge digestion in this plant is performed in two stages called primary and secondary digestion.

The sludge from the primary tanks is pumped, with excess activated sludge, to the primary digester. In the absence of air, and in a regulated temperature of 90 degrees Fahrenheit, the decomposing or digestion process begins. Constant agitation within the tank ensures overall treatment.

The raw sludge is broken down by anaerobic bacterial action and, when thoroughly digested, is a thick, black odourless liquid.

The secondary digester receives the digested material from the primary and completes the process. The secondary digester is not agitated, but is allowed to be quiescent. The supernatant is decanted and returned to the treatment process.

Sludge gas (principally methane), formed during the process, is used as a fuel for the heat exchangers and boiler, supplying heat to the digesters and buildings. The standby fuel is oil.

CHLORINATION

The chlorinator is capable of injecting up to 2,000 pounds per day of chlorine into the final effluent to reduce the bacteria count to acceptable limits.

PROJECT COSTS

NET CAPITAL COST (Final)

Metro Toronto	$1,401,180.66	
Toronto Twp.	482,574.34	
Deduct portion financed by CMHC (Final--Metro only)	185,877.58	
LONG TERM DEBT TO OWRC		$1,697,877.42

Debt Retirement Balance at Credit (Sinking Fund) December 31, 1965

Metro Toronto	$ 114,665.78	
Toronto Twp.	45,269.45	
		$ 159,935.23

The total cost to the municipalities during 1965 was as follows:

Net Operating

Metro Toronto	$ 79,621.93	
Toronto Twp.	60,744.52	
		$ 140,366.45

Debt Retirement

Metro Toronto	$ 24,525.00	
Toronto Twp.	9,738.00	
		$ 34,263.00

Reserve

Metro Toronto	$ 9,650.00	
Toronto Twp.	3,291.00	
		$ 12,941.00

Interest Charged

Metro Toronto	$ 68,187.24	
Toronto Twp.	27,075.60	
		$ 95,262.84
TOTAL		$ 282,833.29

RESERVE ACCOUNT

Balance at January 1, 1965		
Metro Toronto	$ 33,007.62	
Toronto Twp.	11,255.24	
		$ 44,262.86
Deposited by Municipalities		
Metro Toronto	$ 8,237.08	
Toronto Twp.	2,809.60	
		$ 11,046.68
Interest Earned		
Metro Toronto	$ 1,907.60	
Toronto Twp.	776.95	
		$ 2,684.55
		$ 57,994.09
Less Expenditures		
Metro Toronto	$ 2,023.23	
Toronto Twp.	867.10	
		$ 2,890.33
Balance at December 31, 1965		$ 55,103.76

TOTALS BY MUNICIPALITY

	Metro Toronto	Toronto Twp.	Total
BILLINGS			
Net Operating	$ 79,621.93	$ 60,744.52	
Debt Retirement	24,525.00	9,738.00	
Reserve	9,650.00	3,291.00	
Interest Charged	68,187.24	27,075.60	
	$181,984.17	$100,849.12	$282,833.29
RESERVE ACCOUNT			
Balance @ Jan. 1	$ 33,007.62	$ 11,255.24	
Deposited by Municipalities	8,237.08	2,809.60	
Interest Earned	1,907.60	776.95	
	$ 43,152.30	$ 14,841.79	
Less Expenditures	2,023.23	867.10	
Balance @ Dec. 31	$ 41,129.07	$ 13,974.69	$ 55,103.76

MONTHLY OPERATING COSTS

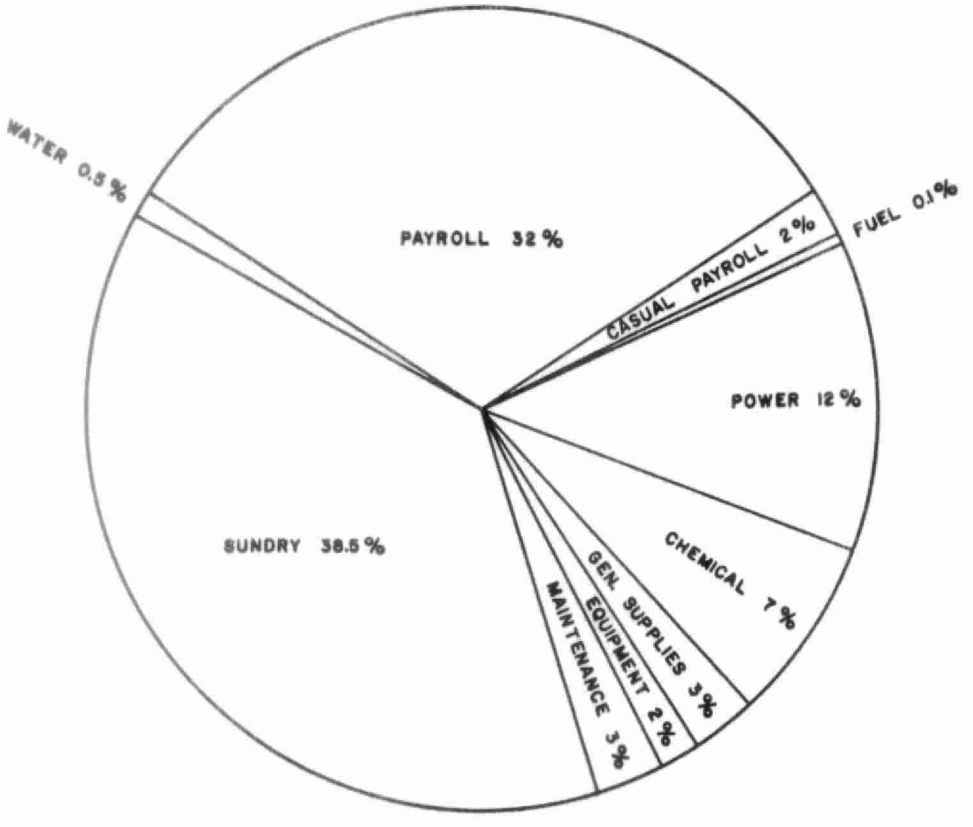
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	*SUNDRY	WATER
JAN	7816.64	2147.87	835.87				168.32	33.83	24.43	4531.35	74.97
FEB	9518.06	2645.90	893.71		1502.88		174.75	5.56	457.14	3838.12	
MARCH	7747.79	3303.16	287.26		1515.92	1759.24	447.16	142.03	126.06	88.79	78.17
APRIL	11880.43	3469.92	269.60		1431.51		37.39		50.71	6618.33	2.97
MAY	17889.88	5446.75	190.19		1363.71	1759.24	249.36	11.35	333.77	8420.35	115.16
JUNE	12174.81	3954.86			1563.79	1749.24	324.71	781.94	862.68	2857.35	80.24
JULY	13386.96	3446.67			1533.61		421.71	175.03	205.64	7540.13	64.17
AUG	14409.76	3621.52		92.46	1198.96		502.99	518.49	431.31	7987.06	56.97
SEPT	11422.39	3663.51			1016.73	1759.24	295.05	278.07	258.62	4103.47	47.70
OCT	11319.36	5307.29	321.56		1540.00		127.26	188.52	286.68	3511.78	36.27
NOV	12665.18	3414.00			1597.42	1759.24	355.74	212.00	451.84	4797.09	77.85
DEC	10135.19	3825.30			3394.16	1770.67	617.23	106.55	624.95	(249.48)	45.81
TOTAL	140366.45	44246.75	2798.19	92.46	17658.69	10556.87	3721.67	2453.37	4113.83	54044.34	680.28

* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE $43,886.37
BRACKETS INDICATE CREDIT

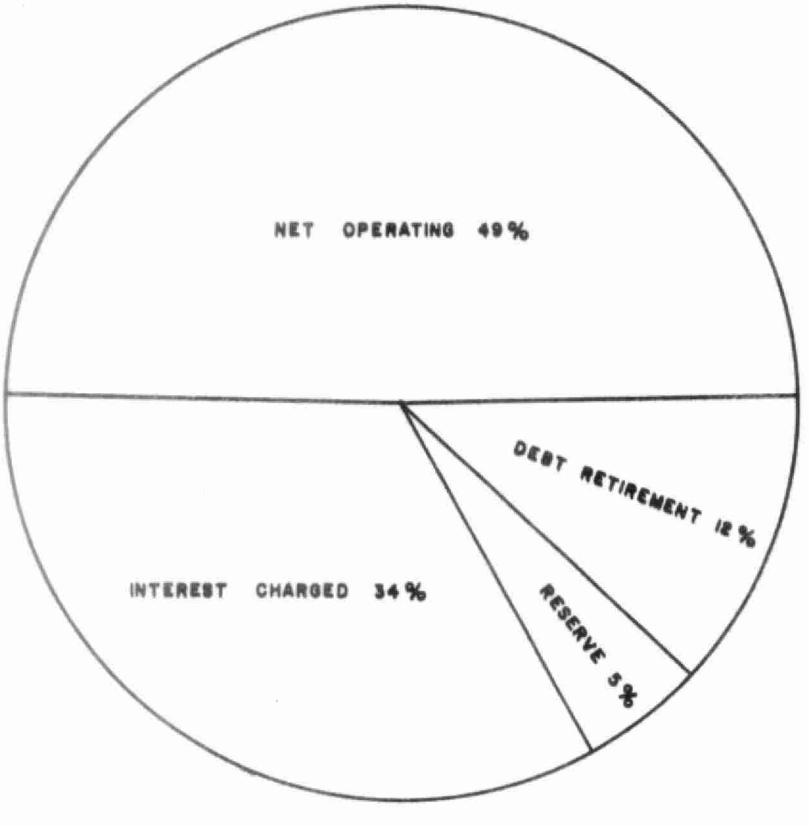
YEARLY OPERATING COSTS

YEAR	M.G. TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER LB. OF BOD REMOVED
1962	740.900	$ 73998.00	99.87	7 CENTS
1963	1209.400	118027.00	98.00	5 CENTS
1964	2358.700	159678.00	67.69	3 CENTS
1965	2623.254	140366.45	53.51	2 CENTS

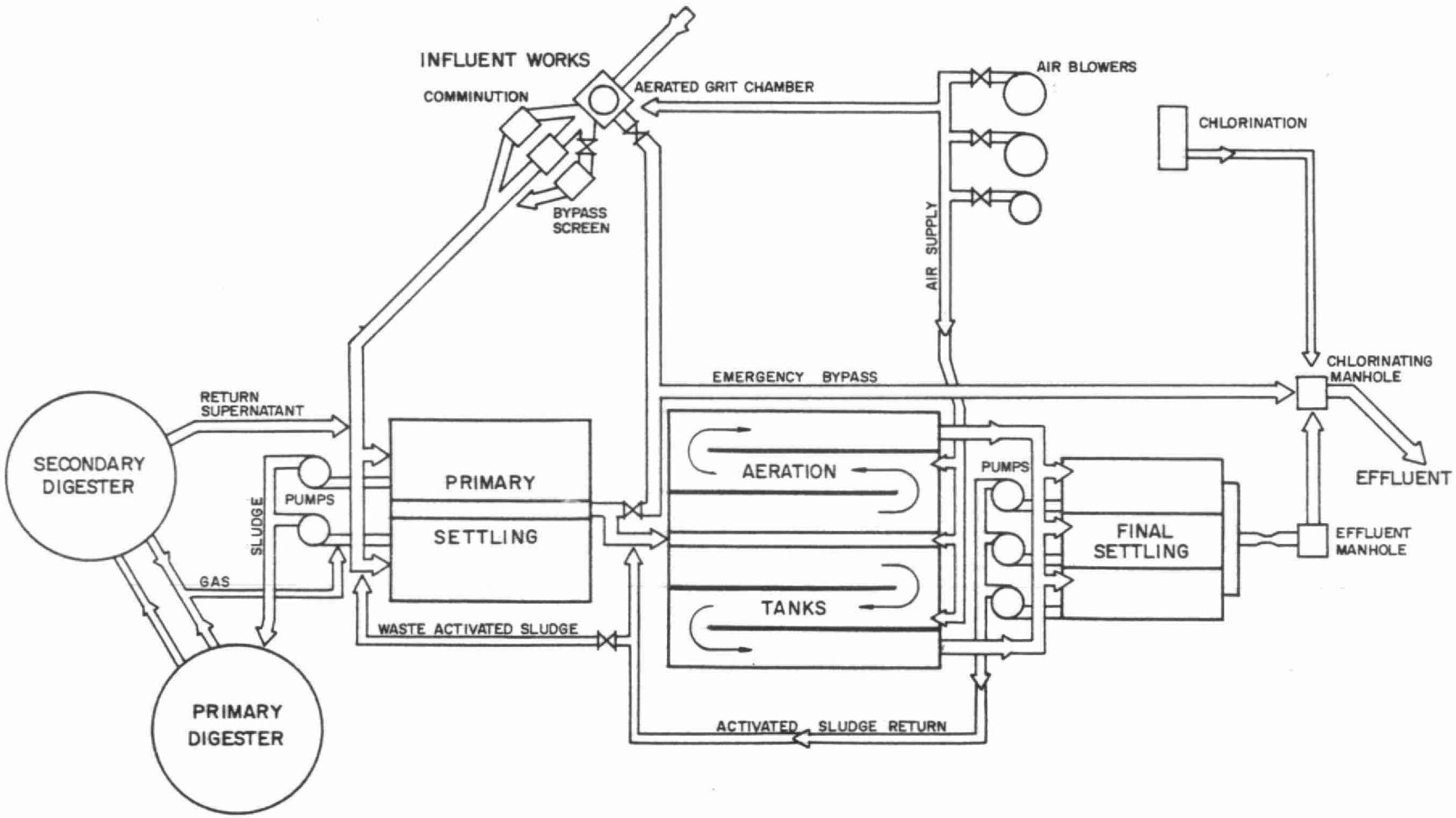
1965 OPERATING COSTS



TOTAL ANNUAL COST



Technical Section



LAKEVIEW WPCP FLOW CHART

Design-Data

GENERAL

Type of Plant - Activated sludge.

Design Population - 50,000 persons.

Design Plant Flow - 5 MGD.

Per Capita Flow - 100 gallons per day.

Five Day BOD -

Raw Sewage	-	225 PPM
Removal	-	90%

Suspended Solids -

Raw Sewage	-	250 PPM
Removal	-	90%

GRIT CHAMBER

14 ft. x 15 ft. 5 in. x 11 ft. deep, with a volume of 2,375 cubic feet, (14,800 gallons), and a design flow detention period of 4.26 minutes.

PRIMARY SEDIMENTATION TANKS

The two tanks, each 87 ft. x 32 ft. x 12 ft. deep, have a combined volume of 66,900 cubic feet, (417,000 gallons). Design detention is 2.0 hours. The surface settling rate is 900 gallons per square foot of tank per day, and the weir overflow rate is 13,000 gallons per lineal foot of weir per day. The longitudinal collector speed is 2.0 feet per minute and the cross collector 4.0 feet per minute.

AERATION

The two rectangular three pass tanks are each 144 ft. x 21 ft. x 14.3 ft. deep, with a combined volume of 250,000 cubic feet, (1,650,000 gallons). The aeration period at design flow is 7.9 hours, and with 25% return activated sludge is 6 hours. The air supply is 1.1 cubic feet per gallon.

FINAL SEDIMENTATION TANK

The three rectangular tanks are 87 ft. x 32 ft. x 12 ft. deep, with a combined volume of 100,000 cubic feet (624,000 gallons). The design detention period is 3 hours. The surface settling rate is 600 gallons per square foot of tank per day, and the weir overflow rate is 7,000 gallons per lineal foot of weir per day. The speed of the longitudinal collectors is 1.0 ft. per minute and the three cross collectors 2.0 ft. per minute.

CHLORINATION

The effluent sewer, approximately 2,000 feet long, acts as a chlorine contact chamber and provides a detention period of 50 minutes.

DIGESTION

Two tanks - concrete roofs - 65 feet in diameter with a combined volume of 164,500 cubic feet. Their capacity is 3.28 cubic feet per capita, and loading is 2.3 lbs. of solids per cubic foot of tank per month.

EQUIPMENT

The two large air blowers each have a rated capacity of 3,900 cubic feet of air per minute and the small blower, 1,700 cubic feet, operating against a gauge pressure of 6.5 psi, with an overall total capacity of 11,500,000 cubic feet of air per day.

Located in the raw sludge pumping station are two raw sludge pumps, 50 gpm at 70 ft. TDH each, and a scum pump, 80 gpm at 70 ft. TDH. Located in the return sludge pumping station are four activated sludge return pumps, 600 gpm each, and a scum pump 50 gpm. Located in the digester control building are two sludge transfer pumps, 150 gpm each, and two sludge recirculating pumps 120 gpm each.

Process Data

MONTH	METROPOLITAN TORONTO MG	TORONTO TOWNSHIP MG	PORT CREDIT MG	TOTAL PLANT MG
JANUARY	122.530	92.434	8.330	223.294
FEBRUARY	103.320	72.177	16.943	192.440
MARCH	126.270	84.504	19.999	230.773
APRIL	137.291	97.597	23.361	258.249
MAY	127.141	72.164	17.505	216.810
JUNE	118.586	63.201	15.078	196.865
JULY	114.163	78.481	16.517	209.161
AUGUST	111.529	68.186	16.179	195.894
SEPTEMBER	109.056	68.217	14.419	191.692
OCTOBER	117.014	86.884	15.148	219.046
NOVEMBER	135.054	76.818	17.963	229.835
DECEMBER	148.471	93.967	16.757	259.195
TOTAL	1470.425	954.630	198.199	2623.254
PERCENT	56.0	36.4	7.6	100.0

COMMENTS

FLOWS

As the above table shows, the flow from Toronto Township was 954.630 million gallons, an increase of 14.4% over 1964. Similarly the flow of 1470.425 million gallons from Metropolitan Toronto was an increase of 8.2% over 1964. Port Credit's flow of 198.199 million gallons was an increase of 21% over 1964.

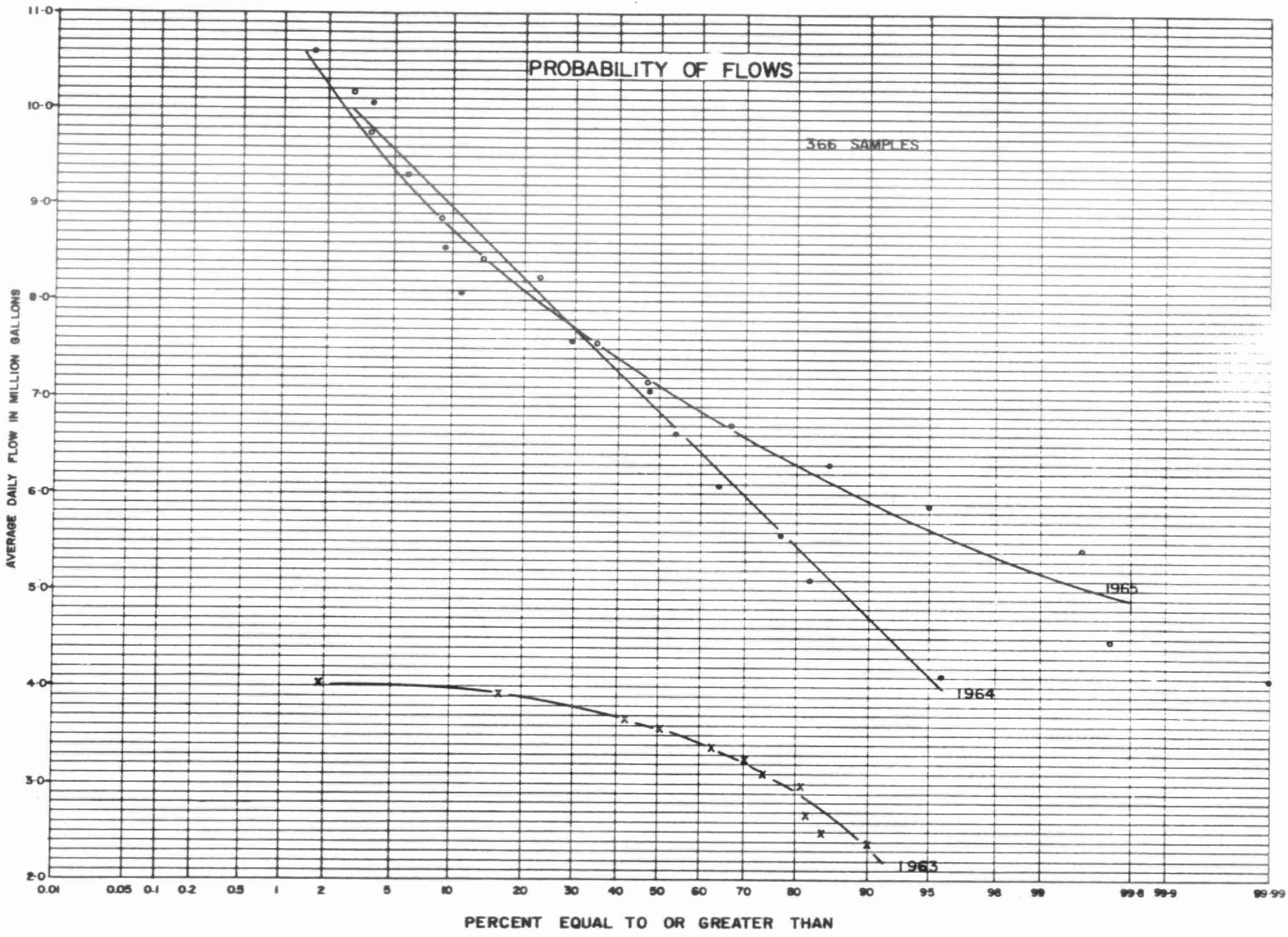
Although Metropolitan Toronto had an increase in flow their percentage contribution to total flow was reduced by 1.6% in 1965.

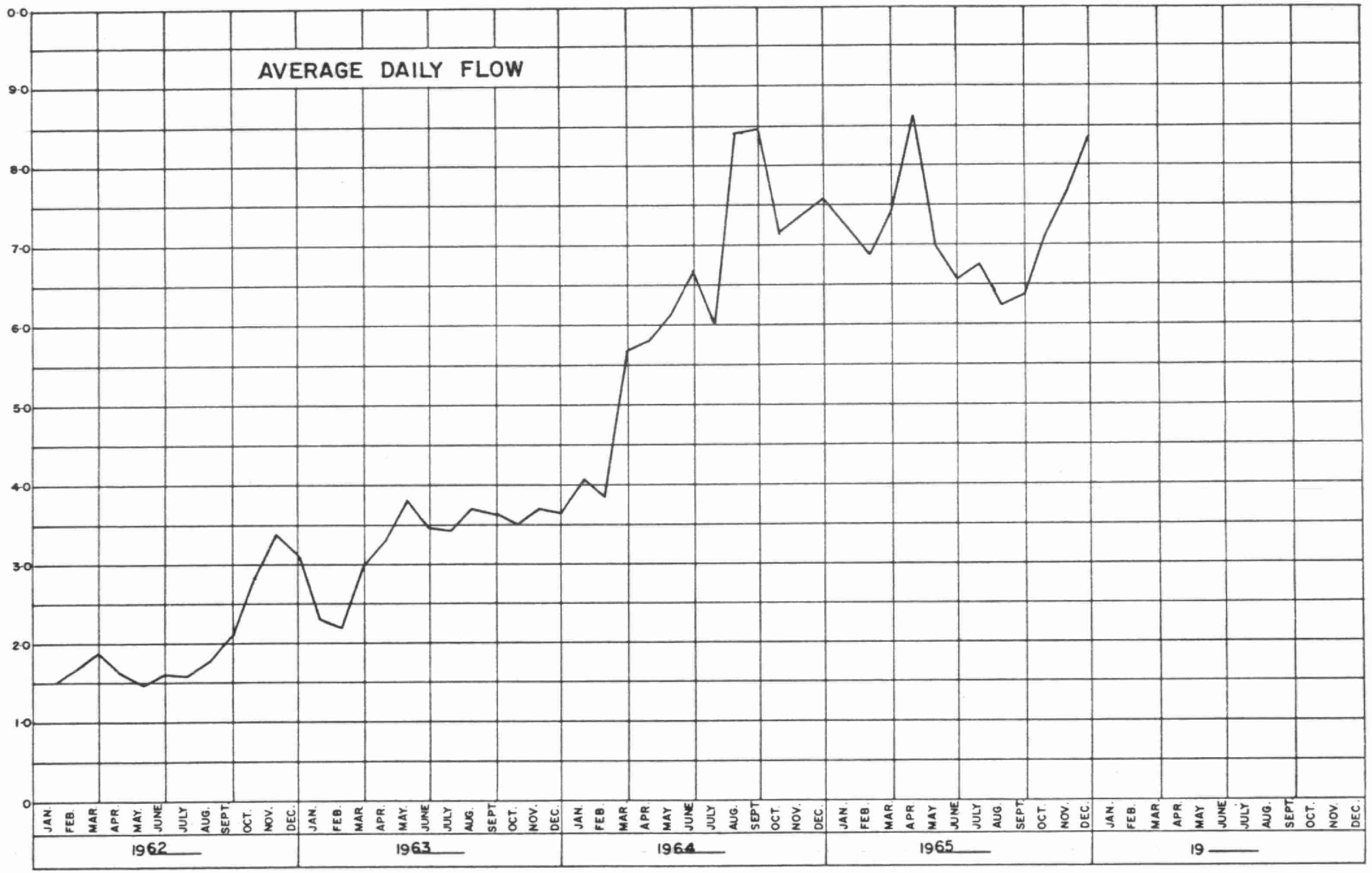
PROBABILITY PLOT

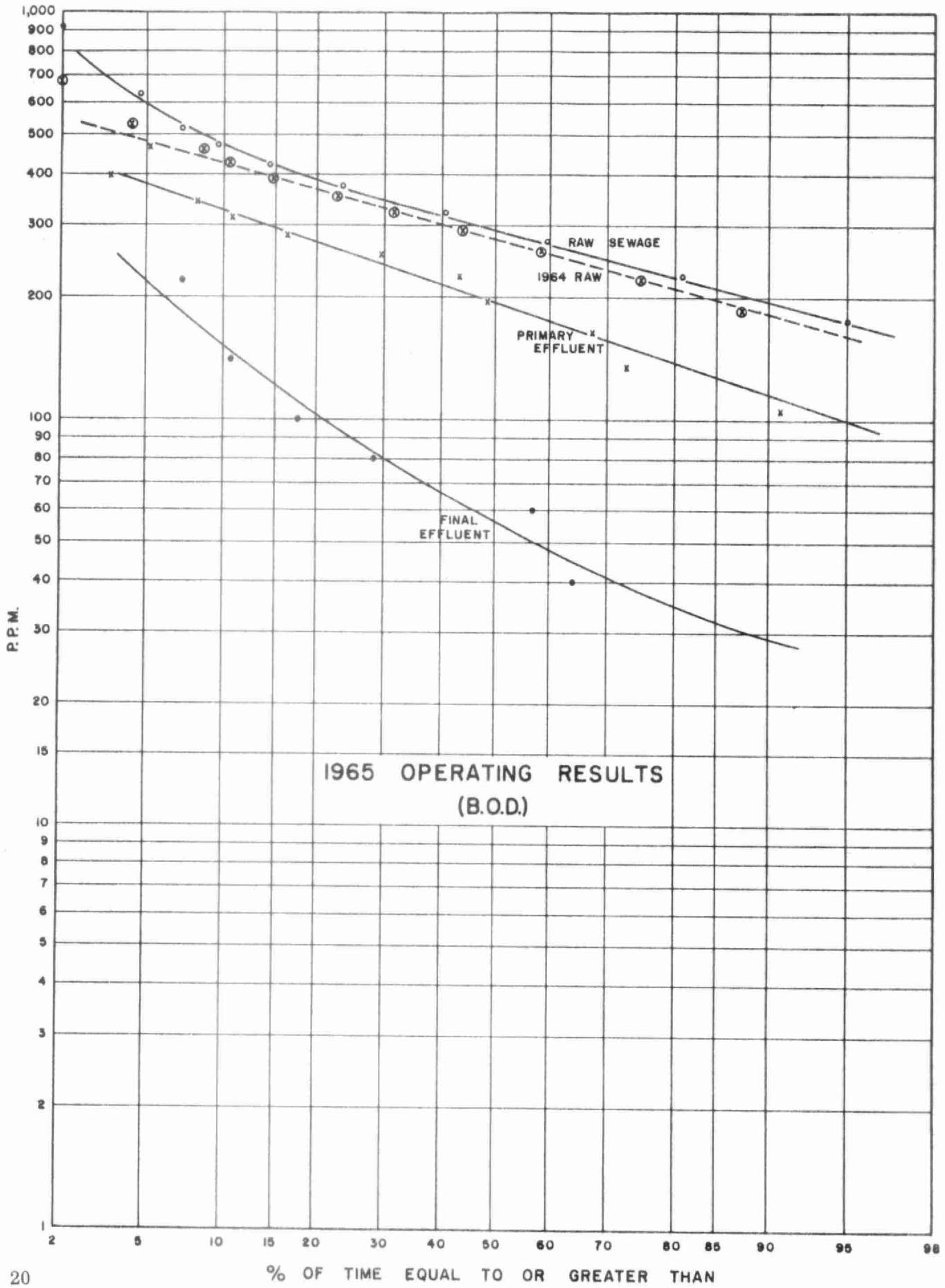
It can be seen that due to efforts of Metropolitan Toronto to limit the amount of sewage being sent to the Lakeview plant that the flows were only increased at the lower flow rates. The plant was overloaded all of the time in 1965.

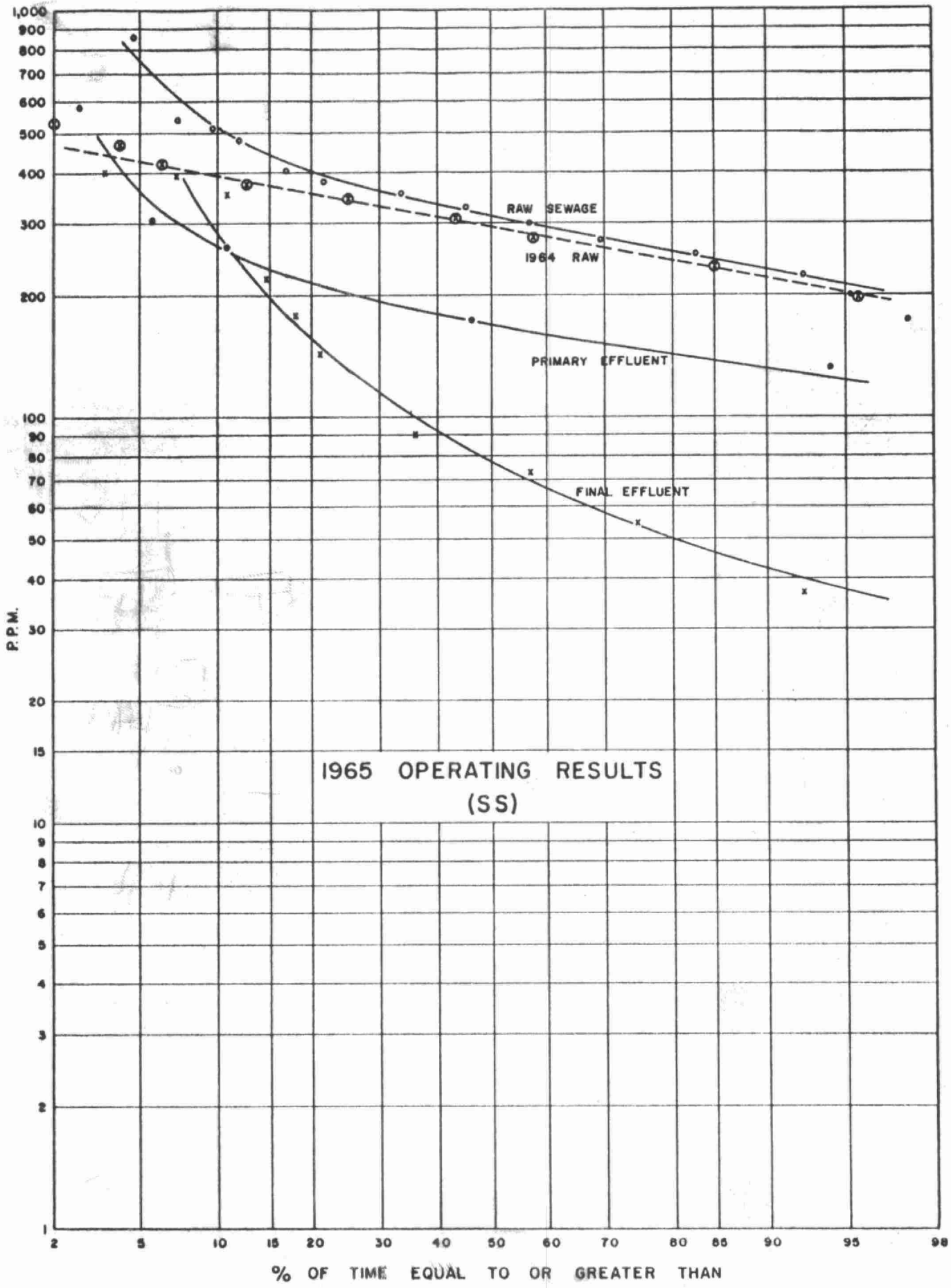
OPERATING RESULTS

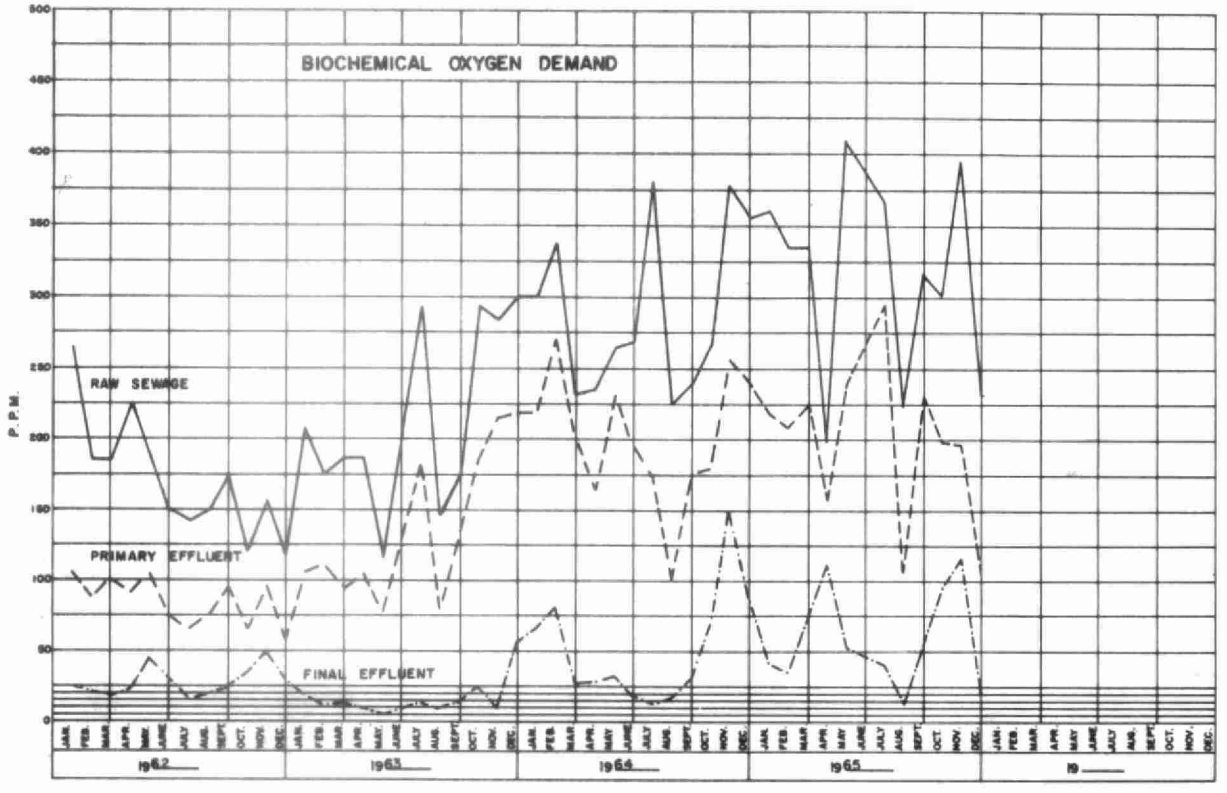
The plant effluent generally exceeded OWRC quality objectives during all of 1965. The final effluent BOD and SS exceeded 56 ppm and 78 ppm respectively 50% of the time.


PROBABILITY OF FLOWS
366 SAMPLES
1965
1964
1963
AVERAGE DAILY FLOW IN MILLION GALLONS
11·0
10·0
9·0
8·0
7·0
6·0
5·0
4·0
3·0
2·0
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99·8
99·9
99·99
PERCENT EQUAL TO OR GREATER THAN

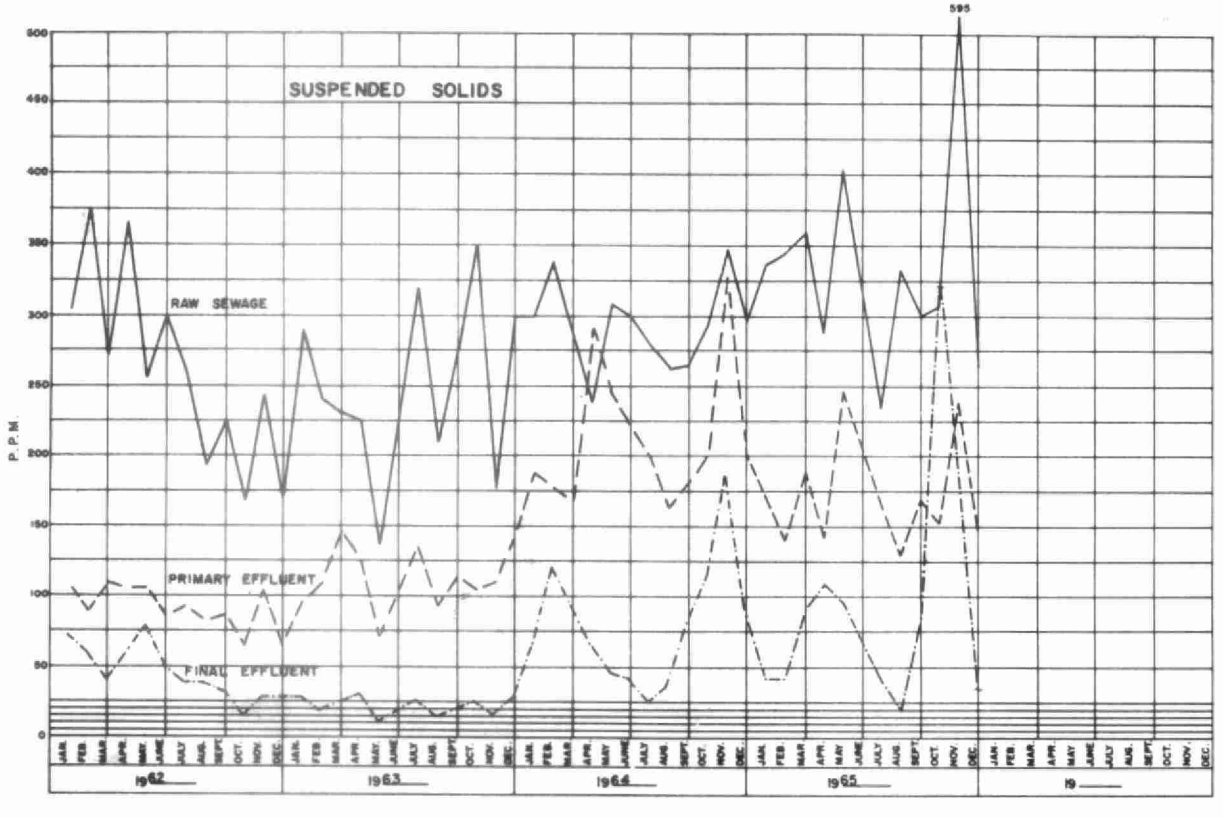

AVERAGE DAILY FLOW
0·0
9·0
8·0
7·0
6·0
5·0
4·0
3·0
2·0
1·0
0
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1962
1963
1964
1965
19


1,000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
15
10
9
8
7
6
5
4
3
2
1
P.P.M.
RAW SEWAGE
1964 RAW
PRIMARY EFFLUENT
FINAL EFFLUENT
1965 OPERATING RESULTS
(B.O.D.)
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
% OF TIME EQUAL TO OR GREATER THAN


1,000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
15
10
9
8
7
6
5
4
3
2
1
P.P.M.
RAW SEWAGE
1964 RAW
PRIMARY EFFLUENT
FINAL EFFLUENT
1965 OPERATING RESULTS
(SS)
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
% OF TIME EQUAL TO OR GREATER THAN



MONTHLY VARIATIONS



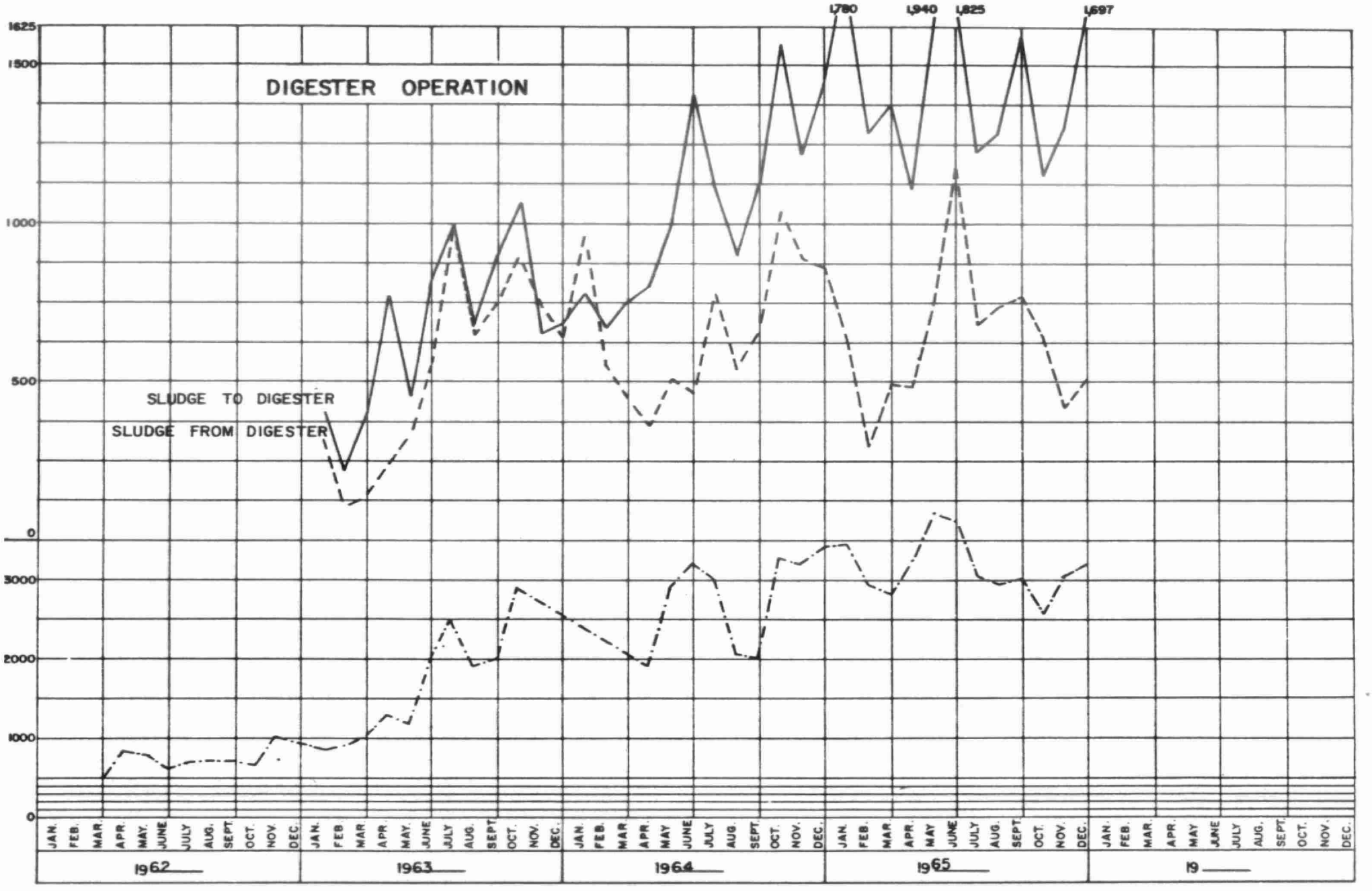
GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	
JAN.	370	42	88.5	366.2	336	43	87.0	327.1	124
FEB.	335	35	89.5	288.7	344	43	87.5	289.6	137
MAR.	335	75	77.5	300.0	359	91	74.5	309.2	197
APR.	199	111	44.0	113.6	288	110	62.0	229.8	198.8
MAY	410	54	87.0	385.9	402	96	76.0	331.7	91.3
JUNE	*317	60	81.0	253.0	*342	96	72.0	242.1	230
JULY	367	41	89.0	340.9	234	35	85.0	208.1	238.1
AUG.	224	13	94.2	206.1	334	19	94.3	307.7	270.0
SEPT.	316	55	82.5	250.2	300	83	72.5	208.0	202
OCT.	302	95	87.0	226.7	308	321	83.0	0.0	115
NOV.	396	118	70.0	319.5	595	181	69.5	457.8	125
DEC.	232	21	91.0	273.4	265	36	86.5	296.8	105
TOTAL	-	-	-	3370.9	-	-	-	3226.6	203.32
AVG.	317	60	81.0	280.9	342	96	72.0	268.9	169.4

* Average results substituted

COMMENTS

The Lakeview Water Pollution Control Plant experienced no major difficulties during 1965 other than excessive overloading of all treatment units. During August when industry was partly shut down, the volume and strength of raw sewage was reduced and a satisfactory effluent was produced.


DIGESTER OPERATION
1780
1940
1825
1697
1625
1500
1000
500
0
SLUDGE TO DIGESTER
SLUDGE FROM DIGESTER
3000
2000
1000
0
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1962
1963
1964
1965
19

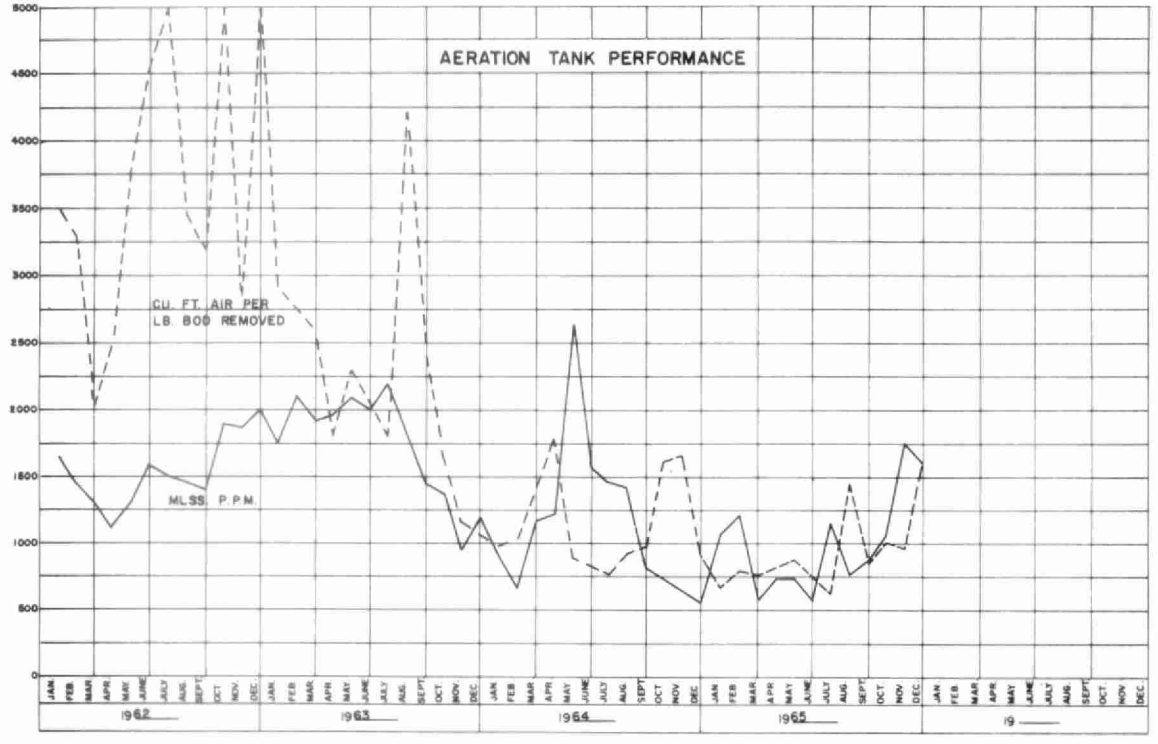
DIGESTER OPERATION

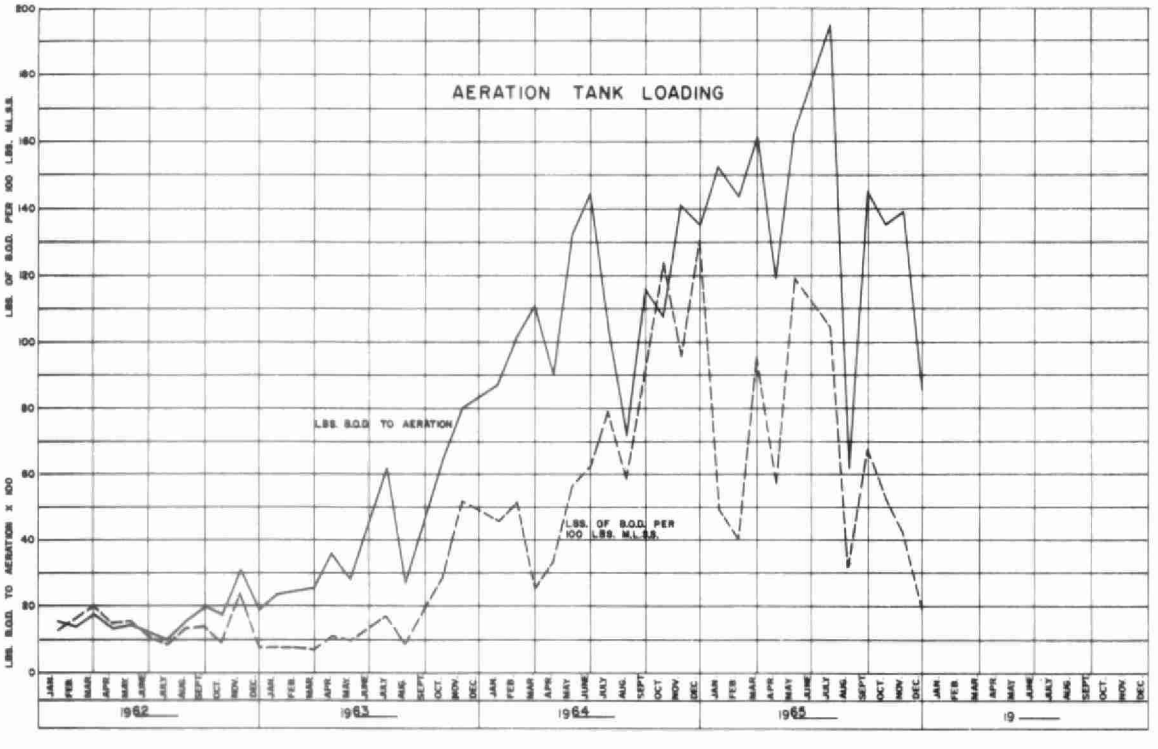
MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS			GAS PRODUCED 1000'S Cu. Ft.
	1000'S CU.FT.	% SOLIDS	% VOL. MAT.	1000'S CU.FT.	% SOLIDS	% VOL. MAT	
JAN.	285.33	4.28	2.91	103.07	-	-	3463.59
FEB.	207.72	4.85	2.87	76.40	-	-	2950.10
MAR.	220.38	4.84	3.33	78.88	3.25	1.58	2840.70
APR.	177.78	5.04	3.07	78.25	6.84	3.42	3265.00
MAY	311.04	4.36	2.99	119.25	6.68	3.59	3363.23
JUNE	292.28	5.28	3.68	188.44	4.68	2.70	3280.92
JULY	197.82	5.28	3.31	109.01	4.00	2.21	3091.92
AUG.	206.94	5.22	3.15	118.50	4.20	2.35	2898.56
SEPT.	254.70	5.60	3.70	123.72	4.70	2.43	3002.54
OCT.	184.29	6.10	3.83	101.43	4.80	2.23	2535.42
NOV.	209.92	5.16	3.12	81.66	-	-	3032.38
DEC.	272.10	5.44	3.28	105.03	5.80	2.58	3196.42
TOTAL	2820.30	-	-	1283.64	-	-	35920.78
AVG.	235.02	5.12	3.27	106.97	4.99	2.57	2993.40

COMMENTS

A total of 2,820,300 cu. ft. of raw sludge at an average solids concentration of 5.12% was pumped to the digesters and 1,283,640 cu. ft. were removed. This is a reduction in volume of 55%. There was a 40% reduction in the volatile solids content.

Gas production was 7.2 cu. ft. per pound of volatile matter added. This is considered normal gas production.


AERATION TANK PERFORMANCE
CU. FT. AIR PER LB. BOD REMOVED
M.L.SS. P.P.M.
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1962
1963
1964
1965
19


AERATION TANK LOADING
LBS. B.O.D. TO AERATION X 100
LBS. OF B.O.D. PER 100 LBS. M.L.S.S.
LBS. B.O.D. TO AERATION
LBS. OF B.O.D. PER 100 LBS. M.L.S.S.
200
180
160
140
120
100
80
60
40
20
0
1962
1963
1964
1965
19

AERATION SECTION

MONTH	PRIM. EFFL. B.O.D. P.P.M.	M.L.S.S. P.P.M.	LBS. B.O.D. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB. B.O.D. REMOVED
JANUARY	219	1084	49	673
FEBRUARY	210	1206	40	790
MARCH	225	573	95	757
APRIL	159	724	57	803
MAY	240	717	119	883
JUNE	-	571	-	-
JULY	295	1164	104	615
AUGUST	106	753	32	1453
SEPTEMBER	232	879	67	872
OCTOBER	198	1061	52	1027
NOVEMBER	197	1754	42	970
DECEMBER	108	1600	19	1643
TOTAL	-	-	-	-
AVERAGE	199	1007	61	953

COMMENTS

The ratio of pounds of BOD per 100 pound MLSS is 61. This value is extremely high and indicates gross overloading. It is not possible to maintain the required amount of MLSS due to air limitations.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	223.294	12579	5.63
FEBRUARY	192.440	12820	6.66
MARCH	230.773	16610	7.20
APRIL	258.249	15608	6.04
MAY	216.810	14722	6.79
JUNE	196.865	12416	6.31
JULY	209.161	11200	5.35
AUGUST	195.894	8680	4.43
SEPTEMBER	191.692	12820	6.69
OCTOBER	219.046	15500	7.08
NOVEMBER	229.835	15640	6.80
DECEMBER	259.195	15075	5.82
TOTAL	2623.254	163670	-
AVERAGE	218.604	13639	6.24

COMMENTS

Chlorination of plant effluent is conducted throughout the year.

In 1965 163,670 pounds of chlorine were used at an average dosage of 6.24 ppm to maintain a satisfactory residual.

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CONCLUSIONS

Flows in 1965 were basically the same as in the latter part of 1964. It was therefore possible to establish operating procedures which effected economies in portions of the process. Digester efficiency showed the most dramatic improvement which, in conjunction with lagooning, made it possible to reduce the total cost of operation from that of 1964.

Effluent continued to be of poor quality. However, it can be seen that when industry was closed down for summer vacation, an effluent of good quality was produced.

RECOMMENDATIONS

Although it is expected that a plant enlargement will be completed early in 1967, close consideration should be given to future requirements so that the possibility of overloading is reduced.

MAY 18 1970

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